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# Sexual Behaviors and HIV/Syphilis Testing Among Transgender Individuals in China: Implications for Expanding HIV Testing Services

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## Abstract

**Background—**HIV and syphilis are disproportionately common among transgender individuals globally, yet few studies have investigated transgender HIV/syphilis risk and testing in low and middle-income nations. We conducted an online survey of men who have sex with men (MSM) and transgender individuals to examine sexual behaviors, and HIV/syphilis testing in China.

**Methods—**We recruited MSM and transgender individuals from two-major Chinese lesbian, gay, bisexual, and transgender (LGBT) web platforms. Chi-square and logistic regression were used to compare risk behaviors, HIV and syphilis testing history, and prevalence between transgender individuals and other MSM.

**Results—**Among the 1320 participants, 52 (3·9%) self-identified as transgender. Demographics, including education, employment, and marital status were similar between both groups, while transgender individuals were older. Condomless anal intercourse rate was comparable between the groups. Transgender individuals were less likely to report ever testing for HIV (34·6% VS 62·0%) and syphilis (15·7% VS 31·2%) with adjusted ORs of 0·36 (95% CI 0·20–0·65) and 0·42 (95% CI 0·20–0·91), respectively. We found a trend towards higher HIV prevalence among transgender individuals (11·1% VS5·7%, *P*=0·12).

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**Conclusion—**Transgender individuals have suboptimal HIV and syphilis testing rates in China. Given the substantial risk behaviors and burden of HIV/STI in the general Chinese MSM population and lack of knowledge about transgender individuals, enhanced HIV/syphilis testing programs for transgender individuals in China are needed.

### Keywords

Transgender; HIV; Syphilis; Testing; China

## Introduction

Although transgender individuals have substantial HIV risk [1], they are persistently under-represented in HIV epidemiology research [2], surveillance programs[1], and interventions[3]. The worldwide HIV prevalence among transgender individuals is approximately19·1% (95% CI 17·4–20·7)[1] and HIV prevalence rates of over 25% has been found in some countries[1, 4]. Most national and local surveillance programs lack transgender specific data collection[5]. In addition, few interventions, such as HIV testing promotion campaigns, have been implemented to specifically target transgender individuals[6].

Studies among transgender individuals have found a wide range of lifetime HIV testing rates, ranging from 54% lifetime testers in Canada to 81% in El Salvador [7] Qualitative research from outside China suggests that social discrimination and stigma[8], lack of social support[9], accessibility of health care (include HIV testing) [4], and fear of disclosure[10] contribute to poor HIV test uptake among transgender individuals.

Recognizing the importance of transgender individuals, the 2014 World Health Organization (WHO) HIV guidelines included transgender individuals as one key population not receiving adequate health services [11, 12]. HIV service provision for transgender individuals may be especially limited in low and middle-income settings where there less is known about these individuals.

Under-representation of transgender individuals in research may also be related to a lack of effective sampling strategies. Sampling methods such as convenience sampling, respondent-driven-sampling, and snowball-sampling have proven to be effective sampling methods for recruiting men who have sex with men (MSM) [13, 14]. However, small absolute numbers of transgender individuals in many communities as well as social and structural barriers (including stigma[15], discrimination[16], and criminalization[17]) complicate survey implementation among transgender individuals[18]. Online surveys may help decrease some of the barriers associated with self-identifying as transgender in formal clinical settings.

We aimed to understand and compare the socio-demographics, sexual behaviors, and HIV and syphilis prevalence and testing history of transgender individuals and non-transgender MSM using online survey data.

## Materials and Methods

We conducted an online survey in May 2013 among Chinese MSM, including MSM who identify as transgender. The largest lesbian, gay, bisexual, and transgender (LGBT) web portal in Guangzhou (http://www.GZTZ.org) as well as a well-known web portal in Chongqing (http://www.manbf.net) hosted our survey. These web portals are online entry points for finding partners, exchanging news, social networking, and banner advertisements for LGBT specific products and research. Previous studies show that Chinese LGBT web portal users tended to be slightly younger and better educated than non-portal users[19]. Eligibility criteria included being born biologically male, 16 years of age or older, lifetime history of anal sex with a man, and provided informed consent prior to the survey. Ethics review committees in China (Guangdong Provincial Center for Skin Diseases and STI Control) and the US (University of North Carolina at Chapel Hill) provided study approval and participants completed an online informed consent process.

### Survey development

To inform survey development, we partnered with local stakeholders, sociologists from the Chinese national survey of sexual behavior, and 60 MSM from the community. MSM community-based organizations reviewed our draft survey. Prior to the final survey launch, we disseminated a pilot survey to 201 MSM/transgender individuals (data not included in final analysis). We used a checklist for reporting results of Internet e-surveys (CHERRIES) throughout the process to improve web survey quality and reporting[20].

### Measures

Our socio-demographic information included age, occupation, living status, marital status, education, and income. Participants were asked about their sexual orientation and whether they currently identify as male, female, or transgender (kua xing bie, meaning “to go beyond sex”). In addition, participants were also asked about the gender of their regular sexual partners, number of sexual partners in the last three months, and history of receptive or insertive condomless anal sex with male and condomless anal sex with female partners. HIV and syphilis testing history were assessed, including testing frequency and history of infection. Participants were asked whether they ever tested for HIV, and what the testing results were (positive, negative or unknown). HIV prevalence was defined as the number of HIV positive individuals divided by HIV ever testers who know their HIV testing results.

### Data analysis

Data was cleaned and re-coded using Microsoft Excel and SAS 9·2 (SAS Institute Inc., Cary, NC). We had minimal missing data and thus used the complete-subject analysis procedure[21]. Descriptive analysis was performed to describe HIV prevalence and the distribution of socio-demographic and high-risk behaviors of the participants. Chi-square test was used to compare HIV prevalence between transgender individuals and non-transgender MSM. Logistic regression was used to compare the difference between transgender individuals and other MSM, while age (continuous), income (<500/501–810/811–1300/>1300 USDs), and marital status (Never married, married, divorced, or widowed) were adjusted for in the multivariate logistic regression models.

### Role of the funding source

The funders of the study played no role in study design, data collection, data analysis, data interpretation, or presentation of results. The authors had full access to all the data in the study and had final responsibility for the decision to submit for publication.

## Results

A total of 1,913 MSM fulfilled our survey eligibility criteria and 1,320 (69·0%) completed the online survey. The sociodemographic and behavioral characteristics of all participants are found in Table 1. In our survey, fifty-two (3·9%) survey participants self-identified as transgender. No participants identified as female.

Over half of the participants were between the ages of 26 and 35 years old and more than three quarters were under 35 years old. Most participants were single (78·0%), identified as gay (73·5%), graduated from college (67·6%), and worked full-time (80·9%) (Table 1). The results of table 2 demonstrate that transgender individuals were similar to other MSM in terms of social-demographic characteristics (Table 2).

Among all participants' main sexual partner, 85·1% were male, 4·8% were female and 10·1% were transgender. Compared to non-transgender MSM, transgender individuals were significantly more likely to have other transgender individuals as their primary partner (aOR 8·1195% CI 2·56–25·69). In addition, transgender individuals were less likely to live with their female partners (aOR 0·10, 95% CI 0·02–0·40), compared to living alone (Table 2).

One hundred and fifty six (11·8%) participants reported condomless sex with women in the last three months. Half of the participants (51·1%) reported condomless anal sex (UAI) in the last three months, with slightly more reporting condomless insertive (42·3%) than receptive (40·5%) sex. The results of multivariate logistic regressions suggested that transgender individuals had similar behaviors such as condomless sex with women in the last three months and condomless anal sex with men in the last three months as non-transgender MSM.

In our study, 793 (60·7%) reported lifetime HIV testing. Among those who ever tested for HIV, the self-reported HIV prevalence was 11·1% among transgender individuals and 5·7% among non-transgender MSM ($P$=0·12). In addition, 515 (39·7%) reported lifetime history of non-HIV STIs testing. The results of multivariate analysis shown that transgender individuals were significantly less likely to have ever tested for HIV (aOR 0·36, 95% CI 0·20–0·65) compared to non-transgender MSM. Among all participants, 403 (30·6%) reported testing for syphilis in their lifetime, with 15·7% for transgender individuals and 31·2% for non-transgender MSM, with adjusted OR of 0·42(95% CI 0·20–0·91) (Figure 1).

## Conclusions

Globally, transgender individuals have long been overlooked in public health research and practice [22, 23]. Their burden of HIV and other STIs is already high, and this knowledge gap has constrains the development of effective public health responses[1]. The WHO guidelines strongly recommends that transgender individuals receive HIV testing and counseling

(HTC) programs [4], yet our research suggests poor HIV and STI test uptake among transgender individuals in China.

Transgender individuals had similar rates of high-risk sexual behaviors (such as condomless anal sex with men and women, and condomless vaginal sex with women) as non-transgender MSM. This has significant public health implications, given the already high prevalence of both high-risk sexual behavior and HIV infection among Chinese MSM[24, 25]. Chinese national and provincial guidelines for HIV behavioral intervention do not mention transgender individuals [5]. The high rates of condomless sex among transgender individuals warrant more intensive interventions.

Our study suggests that transgender individuals have lower HIV testing uptake compared to non-transgender MSM. We found HIV testing rates among transgender individuals substantially lower than reported among both Canadian[26] and El Salvadorian transgender individuals[7]. Research among MSM in China finds stigma[27] and lack of a cohesive community to provide social support in China contribute to decreased utilization of services. These factors may also contribute to low-test uptake among transgender individuals, but further research is needed.

Lower syphilis testing uptake was also observed among transgender individuals. Concurrent syphilis infection increases the likelihood of HIV acquisition[28] and transmission (ref), creating a lethal synergy. Current syphilis test promotion campaigns must be expanded. In addition to scaling up these campaigns, the introduction of social marketing, crowdsourcing, and community/neighborhood-based HIV testing promotion strategies may play an important role in increasing STIs testing uptake [6, 29].

One study strength was the online sampling method. By using online sampling, some of the social and structural barriers that limit efforts to reach transgender individuals were reduced. Another study strength was our ability to simultaneously launch the survey at two sites. A scalable online survey could allow for efficient sampling of transgender individuals across China or in other contexts where transgender individuals face severe discrimination. This is important for targeting numerically small, but important, subpopulations such as transgender individuals.

Our study has several limitations. First our study enrolled a small total number of transgender individuals, and we did not capture female to male transgender individuals or non-internet users. This small sample size limited our power to explore more associations in this population, as well as the ability to adjust for potential confounders. Even with such a small sample size, our results still provide primary data on transgender HIV/STI testing and sexual health behaviors in China. Second, participants were recruited online, and may not represent the general MSM and transgender populations in China. There should be caution in extending our results to other populations. In addition, the response rate between transgender individuals and non-transgender MSM may be different, which may have further biased our study results. However, since no surveillance data on transgender individuals is available in China, we could not compare our study results with others, and we do cannot account for bias at this time. Thus we are unable to generalize our findings to the

entire transgender community. Further research should verify the findings of this online-based study. Third, 31·0% of the eligible participants withdrew from the survey, which may lead to a potential selection bias. However, our survey has similar completion rate to other online surveys [30]. We doubt that survey non-completion would be correlated with sexual identity. Our fourth limitation was the social desirability bias of information such as HIV testing history, HIV serostatus, and HIV related risk behaviors. We used web-based data collection method to help minimize the bias. However, the lower self-reported testing rate among the participants, particularly among transgender individuals, may indicate that this bias is minimal. Furthermore, our study was anonymous which may further reduce social desirability bias. Lastly, this survey did not include detailed information for transgender individuals about hormones, surgery, etc, which further research should investigate.

In summary, transgender individuals in China may have substantially lower rates of both HIV and syphilis testing compared to non-transgender MSM. We found trends toward higher HIV infection among transgender individuals. Transgender individuals had similar rates of condomless sex with men and women as non-transgender MSM, but it is noteworthy that MSM are already an extremely high-risk group in China. These findings are especially concerning given the lack of research on transgender individuals in China. Further research is needed to confirm the findings of this study and better characterize the sexual health and infection prevalence within this population. Expansion of HIV and STI testing programs for transgender individuals, and expansion of behavioral change interventions should also be priorities. Further studies should also investigate stigma and social discrimination, which was not a part of our study.

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## Summary

An online survey of men who have sex with men (MSM) and transgender individuals in China found lower HIV/STD testing history in transgender individuals but similar condomless anal intercourse rates.

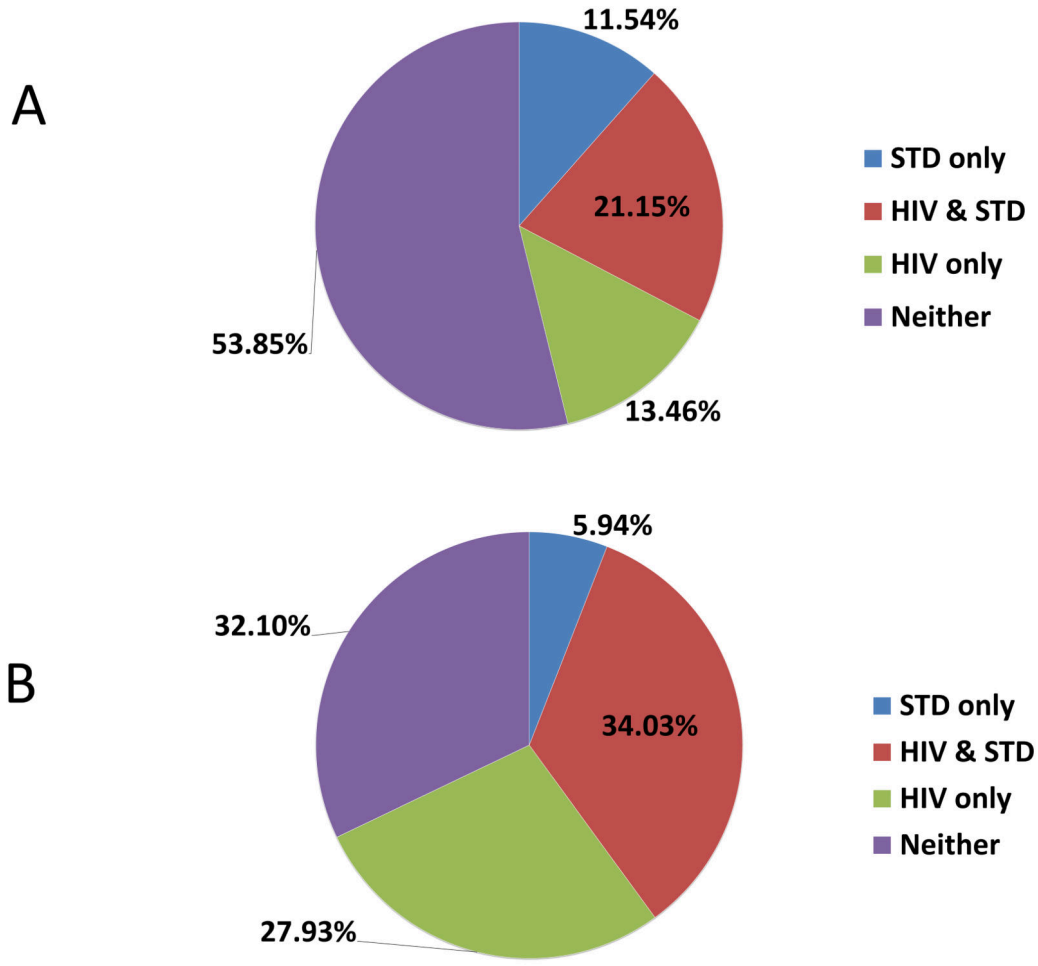


**Figure 1.**

## Table 1

Social-demographic and HIV related risk behaviors of MSM and transgender individuals who attended the online survey conducted in Guangzhou and Chongqing in 2013, China (N=1,320)

| Variables | Total | Percentage (%) |
|---|---|---|
| **Age** | | |
| 16–25 years old | 310 | 23·5 |
| 26–35 years old | 745 | 56·4 |
| 36–45 | 231 | 17·5 |
| >45 | 34 | 2·6 |
| **Marital Status** | | |
| Single | 1029 | 78·0 |
| Married | 201 | 15·2 |
| Divorced/Widows | 89 | 6·8 |
| **Education** | | |
| High School and/or Technical School | 261 | 19·8 |
| College | 892 | 67·6 |
| Graduate Degree | 167 | 12·7 |
| **Occupation** | | |
| Student | 120 | 9·2 |
| Full-Time | 1053 | 80·9 |
| Part-Time | 58 | 4·5 |
| Unemployed | 71 | 5·5 |
| **Living Situation** | | |
| Alone | 458 | 38·0 |
| Boyfriend or Male Partner | 193 | 16·0 |
| Friends or Family | 440 | 36·5 |
| Wife, Girlfriend or Female Partner | 115 | 9·5 |
| **Monthly Income** | | |
| <500USD | 363 | 27·6 |
| 500–810 USD | 379 | 28·8 |
| 811–1300USD | 295 | 22·4 |
| >1300USD | 278 | 21·1 |
| **Gender Identity** | | |
| Male | 1268 | 96·1 |
| Transgender | 52 | 3·9 |
| **Sexual Orientation** | | |
| Homosexual | 963 | 73·5 |
| Bisexual | 347 | 26·5 |
| **Current Partners Gender** | | |
| Transgender | 69 | 10·1 |
| Male | 583 | 85·1 |
| Female | 33 | 4·8 |

| Variables | Total | Percentage (%) |
|---|---|---|
| **Sexual Orientation Disclosure** | | |
| No | 655 | 49·7 |
| Yes | 660 | 50·0 |
| **Self Reported HIV Status** | | |
| Positive | 46 | 5·8 |
| Negative or Unknown | 747 | 94·2 |
| **Non-HIV STIs History** | | |
| Yes | 153 | 11·4 |
| No or Unknown | 1189 | 88·6 |
| **HIV Testing Lifetime** | | |
| Yes | 793 | 60·7 |
| No or Unknown | 514 | 39·3 |
| **STIs Testing Lifetime** | | |
| Yes | 515 | 39·7 |
| No or Unknown | 782 | 61·6 |
| **Syphilis Testing Lifetime** | | |
| Yes | 403 | 30·6 |
| No or Unknown | 913 | 69·4 |
| **Condomless Receptive Anal Sex in past 3 months** | | |
| Yes | 534 | 40·5 |
| No | 786 | 59·5 |
| **Condomless Insertive Anal Sex in past 3 months** | | |
| Yes | 558 | 42·3 |
| No | 762 | 57·7 |
| **Condomless Anal Sex with Men in past 3 months** | | |
| Yes | 675 | 51·1 |
| No | 645 | 48·9 |
| **Condomless Intercourse with Women in past 3 months** | | |
| Yes | 156 | 11·8 |
| No | 1164 | 88·2 |

**Table 2**

Correlates of transgender in an online survey conducted in Guangzhou and Chongqing in 2013, China (N=1,320)

| | Total | Transgender | | Crude Model | | | Adjusted Model* | | |
|---|---|---|---|---|---|---|---|---|---|
| **Variables** | **N** | **n** | **%** | **Odds Ratio** | **95% CI** | **p** | **Odds Ratio** | **95% CI** | **p** |
| **Overall** | 1320 | 52 | 3·9 | | | | | | |
| **Primary Partner** | | | | | | | | | |
| Male | 69 | 3 | 4·3 | *Ref* | | | *Ref* | | |
| Female | 583 | 17 | 2·9 | 1·51 | 0·43 – 5·30 | 0·29 | 1·39 | 0·32 – 6·10 | 0·30 |
| Transgender | 33 | 7 | 21·2 | 8·96 | 3·42 – 23·50 | <0·001 | 8·11 | 2·56 – 25·69 | <0·001 |
| **Condomless Sex with Women past 3 months** | | | | | | | | | |
| No | 1164 | 45 | 3·9 | *Ref* | | | *Ref* | | |
| Yes | 156 | 7 | 4·5 | 1·17 | 0·52 – 2·64 | 0·71 | 0·9 | 0·35 – 2·30 | 0·83 |
| **Living Situation** | | | | | | | | | |
| Alone | 458 | 5 | 1·1 | *Ref* | | | *Ref* | | |
| Family or Friends | 440 | 25 | 5·7 | 0·71 | 0·32 – 1·57 | 0·09 | 0·45 | 0·13 – 1·58 | 0·12 |
| Male Partner | 193 | 9 | 4·7 | 0·58 | 0·22 – 1·50 | 0·54 | 0·59 | 0·20 – 1·77 | 0·28 |
| Female Partner | 115 | 9 | 7·8 | 0·13 | 0·04 – 0·40 | <0·001 | 0·1 | 0·02 – 0·40 | <0·001 |
| **Number of Male Sex Partners Last 3 Months** | | | | | | | | | |
| 0 | 525 | 17 | 3·2 | *Ref* | | | *Ref* | | |
| 1 | 470 | 20 | 4·3 | 0·63 | 0·30 – 1·33 | 0·44 | 0·65 | 0·31 – 1·36 | 0·42 |
| 2 to 5 | 56 | 2 | 3·6 | 0·84 | 0·41 – 1·72 | 0·78 | 0·87 | 0·42 – 1·80 | 0·77 |
| >6 | 259 | 13 | 5·0 | 0·7 | 0·15 – 3·20 | 0·84 | 0·76 | 0·16 – 3·49 | 0·91 |
| **Condomless Insertive Anal Sex Last 3 months** | | | | | | | | | |
| No | 762 | 30 | 3·9 | *Ref* | | | *Ref* | | |
| Yes | 558 | 22 | 3·9 | 1 | 0·57 – 1·76 | 1 | 0·96 | 0·55 – 1·69 | 0·89 |
| **Condomless Receptive Anal Sex Last 3 months** | | | | | | | | | |
| No | 786 | 26 | 3·3 | *Ref* | | | *Ref* | | |
| Yes | 534 | 26 | 4·9 | 1·5 | 0·86 – 2·61 | 0·15 | 1·49 | 0·85 – 2·62 | 0·16 |
| **Condomless Anal Sex with Men Last 3 months** | | | | | | | | | |
| No | 645 | 24 | 3·7 | *Ref* | | | *Ref* | | |
| Yes | 675 | 28 | 4·1 | 1·12 | 0·64 – 1·95 | 0·69 | 1·09 | 0·62 – 1·91 | 0·76 |

| | Total | Transgende r | | Crude Model | | | Adjusted Model* | | |
|---|---|---|---|---|---|---|---|---|---|
| **Variables** | **N** | **n** | **%** | **Odds Ratio** | **95% CI** | **p** | **Odds Ratio** | **95% CI** | **p** |
| **Condomless Anal Sex with Women Last 3 months** | | | | | | | | | |
| No | 1154 | 45 | 3·9 | *Ref* | | | *Ref* | | |
| Yes | 156 | 7 | 4·5 | 1·17 | 0·52–2·64 | 0·71 | 0·9 | 0·35–2·30 | 0·83 |
| **Lifetime HIV Test** | | | | | | | | | |
| No | 514 | 32 | 6·2 | *Ref* | | | *Ref* | | |
| Yes | 793 | 18 | 2·3 | 0·35 | 0·19 – 0·63 | <0·001 | 0·36 | 0·20 – 0·65 | <0·001 |
| **Lifetime Non-HIV STD Test** | | | | | | | | | |
| No | 782 | 34 | 4·3 | *Ref* | | | *Ref* | | |
| Yes | 515 | 17 | 3·3 | 0·75 | 0·42 – 1·35 | 0·34 | 0·76 | 0·42 – 1·38 | 0·36 |
| **Lifetime Syphilis Test** | | | | | | | | | |
| No | 913 | 43 | 4·7 | *Ref* | | | *Ref* | | |
| Yes | 403 | 8 | 2·0 | 0·41 | 0·19 – 0·88 | 0·02 | 0·42 | 0·20 – 0·91 | 0·03 |
| **HIV Infection** | | | | | | | | | |
| No | 747 | 16 | 2·1 | *Ref* | | | *Ref* | | |
| Yes | 46 | 2 | 4·3 | 2·08 | 0·46 – 9·32 | 0·34 | 1·58 | 0·33 – 7·64 | 0·57 |

Note:

* Adjusted model was adjusted for age (continuous), income (<500/501–810/811–1300/>1300 USD) and marital status (Never married/married/divorced or widowed)